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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/595,856	05/16/2006	Haoshen Zhou	OGOSH54USA	7985
270. 7590. 10/16/2009 HOWSON & HOWSON LLP 501 OFFICE CENTER DRIVE SUITE 210 FORT WASHINGTON, PA 19034				
EXAMINER MERCADO, JULIAN A				
ART UNIT		PAPER NUMBER		
1795				
NOTIFICATION DATE		DELIVERY MODE		
10/16/2009		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

docketing@howsonandhowson.com

### Office Action Summary

**Application No.**

10/595,856

**Applicant(s)**

ZHOU ET AL.

**Examiner**

JULIAN MERCADO

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 2, 5, 6, 11, 12 and 26-49 is/are pending in the application.  
4a) Of the above claim(s) 5, 6 and 42-49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 11, 12 and 26-41 is/are rejected.
- 7) ☒ Claim(s) 1, 2, 12, 27-30 and 38-41 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 5-16-06
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_

## **DETAILED ACTION**

### ***Election/Restrictions***

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1, 2, 11, 12 and 26-41, drawn to the product.

Group II, claim(s) 5, 6 and 42-49, drawn to the process of making.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: Groups I and II share the special technical feature of a nanocrystal oxide-glass mesoporous composite powder. As this special technical feature is not a contribution to the art as evidenced by Graetz et al. and Holman et al. for the detailed reasons set forth in the prior art rejections below, unity of invention is therefore found lacking.

During a telephone conversation with William Bak on September 15, 2009, a provisional election was made without traverse to prosecute the invention of Group I, claims 1, 2, 11, 12 and 26-41. Affirmation of this election must be made by applicant in replying to this Office action. Claims 5, 6 and 42-49 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise require all the limitations of the allowable product claim will be considered for rejoinder. All claims directed to a nonelected process invention must require all the limitations of an allowable product claim for that process invention to be rejoined.

In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103 and 112. Until all claims to the elected product are found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowable product claim will not be rejoined. See MPEP § 821.04(b). Additionally, in order to retain the right to rejoinder in accordance with the above policy, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder.** Further, note that the prohibition against double

patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

### ***Information Disclosure Statement***

The Information Disclosure Statement (IDS) filed on May 16, 2006 has been considered by the examiner.

### ***Specification***

The disclosure is objected to because of the following informalities:

Page 3 of the specification make references to Non-Patent documents Nos. 1-4 and Japanese Patent Application No. 2003-386694. The incorporation of these documents by reference is objected to as these documents have not been made of record for consideration (as instructed by the specification) and on their own merits.

Appropriate correction is required.

### ***Claim Objections***

Claims 12 and 27-30 are objected to because of the following informalities:

In claim 12 at line 2, it is suggested to change "2nm to 10nm" to --2 nm to 10 nm--.

In claim 27 at line 2, it is suggested to change "2 to 9nm" to --2 nm to 9 nm--.

In claims 28-30, it is suggested to change "selected from a group consisting of" to --selected from the group consisting of--, in order to more properly recite an acceptable form of a Markush group. See *Ex parte Markush*, 1925 C.D. 126 (Comm'r Pat. 1925).

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 2, 12, 29, 30, 33 and 38-41 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 2 and 38-41 each recites the limitation "thin film". The term "thin" is a relative term which renders the claims indefinite. The term "thin" is not defined by the claims, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim 12 recites the limitation "pores" in line 2. There is insufficient antecedent basis for this limitation in the claim. It is suggested to change "pores" to --mesopores--.

Claim 29 recites the limitation "the glass phase" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 30 recites the limitation "the glass phase" in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 30 recites the limitation "one or more types of dissimilar metal oxides" in line 2. The scope of "dissimilar metal oxides" is indefinite as a reference point for the dissimilarity is not recited in the claim. Furthermore, it is unclear how one metal oxide may be dissimilar in comparison to itself.

Claim 33 recites the limitation "the maximum theoretical capacity in relation to active oxides" in lines 3-4. This limitation is indefinite as the active oxides are not specified, thus, to what extent the charging/discharging capacity may be larger in relation to these unspecified active oxides cannot be ascertained.

Claims 38-41 are rejected under 35 U.S.C. 112, second paragraph, as being dependent upon a rejected a base claim.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11, 12, 26, 27, 29 and 31-37 rejected under 35 U.S.C. 103(a) as being unpatentable over Graetz et al. (U.S. 2004/0126659) in view of Holman et al. (U.S. Pat. 7,087,348).

For claims 11, 12, 26, 27 and 29, Graetz et al. teaches a nanocrystal oxide such as silicon oxide (SiO<sub>2</sub>) having an amorphous shell of silicon oxide for an anode of an electrochemical cell. The composite is a nanoparticle or nanofilm. As an anode of a secondary battery, which is a planar body, the nanostructured silicon is asserted to have a three-dimensional structure. Alternatively, see col. 11 lines 39-50 of Holman et al., which discloses that particles such as in Graetz et al. and Holmal et al. have a "three-dimensional geometry..." such as cubes or

sphericals. The composite oxide has both crystalline and amorphous domains. See pars. [0018], [0019] and [0037] of Graetz et al.

Claim 31 recites an ionic and conductive path being provided during a step of adding ion conductive or electron conductive metal oxides at a specified molar ratio. Claim 32 recites an energy density, claims 34 and 35 recite a high reversible ratio, and claim 36 recites a high reversible capacity, all during a step of increasing the charging/discharging rate. Claim 33 recites using the composite so as to increase the surface area of the electrode of the battery. As all these features are premised on a step of adding, a step of increasing the charging/discharging rate and a step of using the claimed nanocrystal oxide/glass composite, these limitations have not been given patentable weight as the process-of-using limitations do not requisitely further limit the product claim.

For claim 37, an electrochemical cell using the composite oxide has a cycling efficiency of 98%.

Graetz et al. does not explicitly teach mesopores in the electrode. However, Holman et al. teaches perforations [16] in the outer shell [12] of an active material particle. See col. 10 line 23 et seq. and line 65 et seq. The skilled artisan would find obvious to modify Graetz et al. by introducing mesopores into its composite oxide. The motivation for such a modification is to provide "communication of the electroactive material with the exterior." See Holman in col. 5 lines 33-39.



***Allowable Subject Matter***

Claims 1, 2 and 38-41 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Claim 28 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not teach or suggest the instant invention regarding a nanocrystal oxide-glass mesoporous composite, where the nanocrystal oxide is a nanocrystal metal oxide.

Claim 30 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record does not teach or suggest the instant invention regarding a nanocrystal oxide-glass mesoporous composite, where the glass phase of the composite contains one or more types of metal oxides.

***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Mori et al. (US 2003/0003364) teaches a glass like solid state electrolyte for a lithium-ion-supporting layer [2] including a composite of  $\text{Li}_2\text{O}$ ,  $\text{SiO}_2$  and  $\text{P}_2\text{O}_5$ . See par. [0063]. Fu (US 2003/0205467) teaches glass ceramics having a high lithium ion conductivity including  $\text{TiO}_2$  and  $\text{P}_2\text{O}_5$ . Visco et al. (U.S. Pat. 6,025,094) teaches a thin film metal-containing glass

composition that is "substantially free of pores, defects, and any pathways allowing air, moisture, electrolyte, and other outside agents from penetrating through it to metal layer 16." See col. 5 line 43 et seq. Iriyama et al. (U.S. Pat. 7,202,000) is cited of cumulative relevance.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Julian Mercado whose telephone number is (571) 272-1289. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan, can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

/Julian Mercado/  
Examiner, Art Unit 1795

/PATRICK RYAN/  
Supervisory Patent Examiner, Art Unit 1795